

March 30, 1874.

ON SOME NEW OR LITTLE KNOWN FOSSILS
FROM THE SILURIAN AND DEVONIAN ROCKS
OF ONTARIO.

By E. BILLINGS, F.G.S.

SILURIAN.

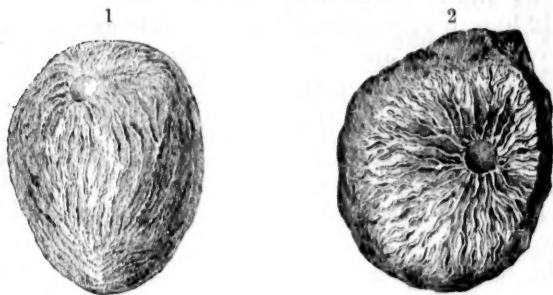


Fig. 1.—*Aulocopina Granti*.—A nearly perfect specimen.

" 2.—The summit of a larger specimen.

(Both figures natural size. The true characters of the surface cannot be perfectly represented by wood engravings.)

Genus AULOCOPINA (N. G.)

In a box of fossils lately sent to the Geological Survey by Major Grant, of Hamilton, there are several specimens which appear to me to belong to a new genus of sponges. The most perfect is of an elongate, ovate, or pyriform shape. The larger, or upper extremity, is more or less concave, with a small circular space in the centre, which appears to be the mouth of a tubular cavity that penetrated inwards and downwards, along the vertical axis of the sponge. I shall call it the "osculum." From its edges numerous small, irregular, sometimes branching ridges, radiate outwards in all directions over the surface, and descend the sides to the base. Several polished sections, through the osculum, downwards, show that the centre, at least in the upper half, was occupied by a large tubular canal, with smaller ones branching from its sides, outwards and downwards. This structure is only indicated by the dark colour of the material which fills the canals, in contrast with the light grey chert, which constitutes the mass of the fossil.

This genus somewhat resembles *Aulocopium* in its structure, but differs in having its whole surface covered with the rounded

irregular ridges above mentioned. I propose to call it *Aulocopina*, and shall, hereafter, with additional material, endeavour to give a more detailed account of it.

I shall dedicate the only species known to me, to its discoverer, Major Chas. Coote Grant, H. P. 16th Regt. Foot.

1. A. GRANTI.—One of the specimens is 16 lines in length and 12 lines in width about the middle. The osculum is a little over two lines in width. There are in general from 5 to 9 striae or ridges on its surface in the width of 3 lines. These radiate from the osculum and continue down to the base, so that the whole surface is covered with them. The specimen is somewhat compressed, so that a transverse section through the mid-length would be a somewhat irregular ellipse, the greater axis 12 lines, as given above, and the lower 9 lines.

The second specimen is also somewhat compressed, and is elongate-ovate, proportionately more slender than the former. Length 14 lines; greater diameter at the middle 8 lines; lesser diameter 6 lines; diameter of the osculum 2 lines. There are 6 to 8 striae in the width of 3 lines, and they cover the whole surface.

The third specimen shows only the summit of a large individual. The diameter is 14 lines; width of the osculum 2 lines; there are from 6 to 8 ridges in the width of 3 lines. The central portion is concave, the osculum being situated in the bottom of the concavity.

A fourth specimen, a fragment, has a diameter of 2 inches at the summit; the osculum 4 lines wide.

Occurs in the Niagara formation at Hamilton.

DEVONIAN.

The Devonian fossils, described in this paper, having been all collected within a limited area in Ontario, I shall not give the localities after each species, but only mention here that all the Corniferous species are from the Counties of Haldimand, Welland, and Oxford. The species of the Hamilton formation are from the Township of Bosanquet.

The internal structure of the corals, was ascertained principally from polished sections, skillfully prepared by Mr. T. C. Weston, the Lapidary of the Survey.

Genus AMPLEXUS.

2. *A. EXILIS*.—Corallum more or less curved, expanding to a diameter of 14 lines at $3\frac{1}{2}$ inches from the base. Surface with very distinctly defined costal striæ, of which there are 5 in the width of 3 lines, where the diameter is about one inch, and 6 or 7 in the same space at the base. There are about 64 septa where the diameter is 14 lines. The larger of these are scarcely a line in depth; the smaller about half that size. The tabulæ are very thin, flat or slightly undulating, distant from each other from 1 to 6 lines.

Owing to the fragile character of the shell, good specimens of this species are rare. The best in our collection consists of the lower 6 inches partly imbedded in the rock. By the application of acid, the whole of the interior has been completely freed from the limestone which filled it, so that it shows the tabulæ and septa perfectly. It is curved, somewhat irregularly, to a radius of between 4 and 5 inches. There are numerous small rings of growth, in general not very prominent, but with some that are angular and strongly elevated. These are, sometimes, so deep that they give to the costal striæ a nodose appearance.

The extremely rudimentary state of the septa, distinguishes this species from all the described American forms known to me.

Occurs in the Corniferous.

3. *A. MIRABILIS*.—Corallum sometimes abruptly curved in different directions, expanding to a width of from 15 to 20 lines in a length of 4 or 5 inches from the base; above which it becomes more nearly cylindrical. Surface with fine engirdling striæ, in general 4 or 5 in the width of 2 lines, but in some places, the same number occur in the width of one line. There are also numerous angular rings of growth, distant from 2 to 15 lines from each other, with sub-concave spaces between. Septal costæ rounded, distinctly defined by sharp striæ between them, 7 or 8 in the width of 3 lines near the base, and 4 or 5 in the same near the calice. There are about 40 large septa at the calice, where the diameter is about 18 lines, with the same number of small ones between them. The larger have a depth of 3 or 4 lines and the smaller 1 line. All of the septa are more or less curved, sometimes very tortuous. The tabulæ have not been observed.

The above description was drawn up from a specimen, 11

inches in length, measured along all the curves. It is 15 lines in diameter at 5 inches from the base, and about 18 lines at the cup. The septal costæ are very distinctly defined at the base but become more flattened and obscure upwards. In external characters it resembles *A. exilis*, but the much greater development of the septa distinguishes it therefrom.

To *A. mirabilis*, I add, provisionally, a specimen which when perfect, must have been 2 feet in length. It is 17 lines in diameter at the calice and about 11 lines at 12 inches below. There are about 45 large septa at the base of the cup, with an equal number of smaller ones. Depth of the larger, 3 to 5 lines, and of the smaller, 1 or 2 lines. As in the former specimen all the septa are more or less curved.

Both specimens occur in the Corniferous.

Genus ZAPHRENTIS.

4. *Z. INVENUSTA*.—Corallum somewhat slender, expanding to a diameter of 16 lines in a length of 7 inches. Surface with numerous rounded rings of growth, of all sizes up to 3 lines in width. Costal striæ about 8 in the width of 3 lines, where the diameter is 10 or 12 lines. Where the diameter is 15 lines there are about 50 large and the same number of small septa. The larger have a depth of about 5 lines and the smaller 4 lines. They seem all to be slightly flexuous at their inner edges. The cup is about 1 inch in depth, the bottom smooth, flat or slightly concave and 4 lines wide. There is a small septal fossette. Occurs in the Corniferous.

5. *Z. ERIPHYLE*.—Corallum turbinate, slightly curved, expanding to a width of 2 inches in a length of about 4 inches. Surface with numerous small, mostly sharp-edged rings of growth. Near the base there are 7 or 8 costal striæ in the width of 3 lines; near the calice there appear to be 4 or 5. There are about 60 large septa, at a diameter of 2 inches. Many of these extend inwards to the centre. There are also 60 small septa, of a depth of from 5 to 7 lines. Bottom of the cup nearly flat, about 10 lines wide. The septal fossette is of an ovate form, its outer edge not reaching the margin, its inner extremity about half way to the centre.

This species is allied to *Z. invenusta* in having about the same numbers of septa in the same width. It differs in having a much greater diameter, and the large septa reaching the centre. Occurs in the Corniferous.

6. *Z. HECUBA*.—Corallum large, expanding to a diameter of $2\frac{1}{2}$ inches in a length of 4 inches. Surface with numerous, slightly elevated, rings of growth. Costal striae at the margin of the calice about 1 line wide; 5 or 6 in a width of 3 lines at the base. Where the diameter is 28 lines, there are 50 large septa, many of which reach the centre. Between these there are 50 smaller septa of about 1 line in depth. The calice in a specimen $5\frac{1}{2}$ inches in length, measured along the convex curve, is 20 lines deep. The wall is very thin, all the septa reaching the margin, on approaching which, they all become of nearly the same size, and reduced to thin elevated ridges, less than a line in height, with concave grooves between them. The bottom of the cup occupies about half the whole width, nearly flat, the septa forming small elevated lines upon its surface, converging to the centre. The fossette is large and has three septa in it; one large and two small. This species resembles the last, but differs therefrom in being a larger form, with the rudimentary septa less developed. There is also a strong likeness between it and *Z. Stokesi*. Corniferous.

7. *Z. EGERIA*.—Corallum, often strongly curved for 2 or 3 inches at the base, becoming more nearly straight above; expanding to a width of from 18 to 26 lines in a length of 4 or 5 inches. Surface with numerous rings, and a few undulations of growth. Epitheca thin, with 8 or 10 costal striae in a width of 3 lines near the base; about half that number in the same space in the upper part of the coral.

In one specimen, in a transverse polished section, 3 inches from the base; there are 64 large septa 3 or four lines in depth, and the same number of small ones between 1 and 2 lines in depth. The diameter of the coral is here 18 lines.

In another individual, there is the same number of septa as in the former, the larger 5 or 6 lines in depth and the smaller from 2 to 4 lines. The diameter of this section is 25 lines and was cut across the coral at $4\frac{1}{2}$ inches from the base.

A silicified specimen, 6 inches in length, shows that the cup is over an inch in depth, and the tabulae excessively thin and fragile.

This is a more slender species than *Z. Hecuba*. It differs further in having more numerous septa at the same diameter and the large ones not reaching the centre except apparently near the base. It occurs in the Corniferous.

8. *Z. GENITIVA*.—Corallum turbinate, curved, expanding to a width of 21 lines in a length of $4\frac{1}{2}$ inches. Surface with a few rounded folds of growth. Septal striæ 8 or 9 in the width of 3 lines at the base; in the upper part where the surface is perfect the striæ are not visible (in the specimen examined), but where a little worn there are about 6 in 3 lines, indicating both the large and small septa; or 3 where only the large septa are represented. At a diameter of 18 lines there are 56 large septa, 6 or 7 lines in depth; some of them reach nearly to the centre. The small septa are two or three lines in depth. The bottom of the cup is smooth with a slightly elevated, low pyramidal columella, forming a low ridge in the direction of a line drawn through the fossette. The latter is large, ovate, the smaller extremity pointing outwards. Occurs in the Corniferous.

9. *Z. SUBRECTA*.—Corallum somewhat straight, flexuous, gradually expanding to a diameter of 21 lines in a length of 6 inches. Surface with rounded folds of growth and a few broad undulations. Septal striæ 9 in the width of 3 lines at the base, becoming wider and more indistinct upwards. There are 38 large septa at a diameter of 18 lines, from 3 to 5 lines in depth; small septa, in general from $\frac{1}{4}$ to 1 line in depth. Occurs in the Corniferous.

Genus HETEROPHRENTIS (N. G.)

see. Rep. Geol. Surv. of Ohio, p. 237.

Corallum simple, turbinate. Calice large with a well defined septal fossette, the bottom either smooth or with a pseudocolumella.* Septa below the calice sharp-edged, often with their inner edges twisted together; above the floor of the calice they are usually rounded, especially on approaching the margin. There is apparently only a single transverse diaphragm, and this forms the floor of the cup.

This genus is intended to include (more especially) such species as *H. spatiosa*, *H. excellens* and some of those referred to *H. prolifica* = (*Zaphrentis prolifica*).

✓ 10. *H. SPATIOSA*.—This species I have heretofore called *Zaphrentis spatiosa*. It is a short, rapidly expanding species. Length of the typical specimen 3 inches, width at the margin $2\frac{1}{2}$ inches,

* For the sake of brevity, I shall hereafter make use of the word columella.

where there are about 90 low rounded septa, somewhat unequal in size but in general 6 or 7 in the width of $\frac{1}{2}$ an inch. As all the specimens seen, are partially filled with siliceous limestone, which cannot be removed by the application of acid, I have not, therefore, been able to ascertain the characters of the bottom of the calice. Corniferous.

11. *H. EXCELLENS*.—Corallum turbinate, moderately curved, expanding to a diameter of $2\frac{1}{2}$ inches in a length of 6. Surface with numerous more or less angular folds of growth. Depth of calice 21 lines. Septa about 100 at the margin, rounded, slightly elevated, becoming sharp-edged and serrated as they descend. Bottom of the calice, striated by the edges of the large septa, a few of which reach the centre and ascend the columella. The latter 2 or 3 lines in height. A large and deep septal fossette. Corniferous.

✓ 12. *H. COMPTA*.—Corallum turbinate, curved, expanding to a diameter of 18 lines, in a length of 4 inches. Surface with rounded or sub-angular folds of growth. Calice 12 lines in depth. No columella. A moderate sized, septal fossette. There are about 100 septa at the margin of the cup. Corniferous.

13. *H. PROLIFICA*.—This species was published in Canadian Journal, March, 1859, and was made to include a number of closely allied forms, which could not be then separated for want of sufficient material. I now propose to confine it, to the group typified by the specimen figured with the original description, and in the Geology of Canada, page 365. It may be thus described—Corallum simple, turbinate, curved, expanding to a width of from 18 to 24 lines in a length of from 2 to 4 inches. Surface with a few undulations of growth. Septal striæ 8 to 10 near the base and 6 to 8 in the upper part in a width of 3 lines. Septa from about 100 to 120 at the margin (where they are all rounded), most common number from 100 to 110. In general they alternate in size at the margin; the small ones becoming obsolete on approaching the bottom of the calice; the large ones more elevated and sharp edged. The septal fossette is large and deep, of a pyriform shape, gradually enlarging, from the outer wall inwards for one-third, or a little more, of the diameter of the coral, at the bottom of the calice. Its inner extremity is usually broadly rounded or, sometimes, straitish, in the middle. It cuts off the inner edges of from 8 to 12 of the principal septa

which may be seen descending into it to various depths. The surface layer of the bottom of the cup, extends the whole width, bending downwards a little near the margin, as in *Zaphrentis*, and uniting with the inner wall of the cup all around. It thus seems to represent one of the tabulæ of a *Zaphrentis*. The following are the principal variations observed in this part of the fossil.

1. Specimens with a perfectly smooth space in the bottom of the cup; no columella.
2. A smooth space with a small conical tubercle near the centre.
3. Smooth with a small ridge, two lines in length and half a line in height and width.
4. Smooth with a compressed columella 3 lines in length, 2 lines in height, most elevated next to the fossette, gradually declining in height towards the opposite side.
5. Smooth spaces very small, columella, a low elongated ridge, with a few tubercles on its crest.
6. Columella well developed, but with tubercles on it and around it.
7. Septa reaching the columella and more or less corrugated and either with or without a columella.

In all cases where the columella is elongated, its length extends in a direction from the fossette to the opposite side. In those which have the septa extending to the centre the columella is often represented by a low rounded elevation.

It is difficult, perhaps impossible, to decide whether or not this group of forms, is specifically distinct from *H. excellens*. The greatest difference is seen in the surface characters. In *H. excellens* the folds of growth are in general numerous and angular, although some are rounded. In *H. prolifica* they are in general few and nearly always rounded. In *H. excellens* I have only been able to make out the septal striæ distinctly in one specimen. At 1 inch from the base there are 5 and at $2\frac{1}{2}$ inches 4 in the width of 3 lines. In *H. prolifica* there are 8 to 10 at 1 inch, and 6 to 8 at $2\frac{1}{2}$ inches.

To this may be added that *H. excellens* is extremely rare, while *H. prolifica* is very abundant.

H. prolifica is abundant in the Corniferous. I have seen only one specimen from the Hamilton group.

Genus GYROCERAS.

* 14. G. NUMA.—The only specimen of this species in the collection is a cast of the interior, which is sufficiently perfect to give us the number of the whorls and their form, but does not show the distance of the septa from each other, nor the position of the siphuncle. Shell large, consisting of about three whorls, all in contact, except a small portion of the last one at the aperture, which is disengaged. The dorso-ventral diameter of the whole coil is about 10 inches; of the two first whorls about $3\frac{1}{2}$ inches. The transverse diameter of the third whorl at its smaller extremity is 30 lines; dorso-ventral diameter of the same about 21 lines. The dorso-ventral diameter of the last whorl at about the point where it becomes separated is 4 inches, but as only a part of the transverse section of this whorl is seen, and the shell appears to have been compressed laterally, this dimension may be too great. On the ventral side of the last whorl there is a wide, slightly depressed furrow along the median line. This also may be the result of pressure. On a part of the second whorl, six or seven shallow rounded annulations are indicated, each of them two or three lines wide, and separated by grooves of the same width. A fracture in one place shows that the septa are deeply concave. As the aperture is broken away, it cannot be determined how much of the last whorl is free in the perfect fossil, but judging from appearances I should say not much more than two inches. Corniferous.

Genus ORTHOCERAS.

15. O. ANAX.—Shell about 2 feet long and from 3 to $3\frac{1}{2}$ inches in diameter at the aperture. Septa from 6 to 8 in a length of 2 inches, where the diameter is 18 lines. Siphuncle nearly central, cylindrical or nearly so, 2 lines in thickness where the diameter of the shell is 16 lines.

The best specimens in the collection, (those from $1\frac{1}{2}$ to 2 feet in length) show none of the septa except in the 5 or 6 inches of the smaller extremity. One only, shows a single septum which is $5\frac{1}{2}$ lines deep where the diameter is $2\frac{1}{4}$ inches. In the same locality, and in the same state of preservation, were found a number of fragments in which there are 8 or 9 septa in a length of 4 inches, where the diameter is between 2 and 3 inches. I think these all belong to the same species.

* Specimen
from Point
Pelee
pres. to the
Survey by
Rev. W. Minter
Leaborn
in 1885.

Genus LICHAS.

X 16. *L. SUPERBUS*.—The frontal lobe of the glabella of this extraordinary trilobite has almost exactly the form of an egg, covered with tubercles, and placed on the anterior half of the head; its greater length corresponding, in direction, with the length of the body. Behind this there are two much smaller, sub-conical elevations, separated from each other by a depressed space or channel, the bottom of which is either flat or slightly convex. Close behind these the occipital furrow crosses the head; and next in order, the occipital ring or neck segment. The channel between the cones, proceeding in a direction forwards, divides into two branches, which diverging right and left, separate the anterior sides of the cones from the posterior part of the large frontal lobe. The base of the frontal lobe has a concave constriction all around, so that on a side view, the lobe seems to stand upon a low pedicel, nearly as broad as itself.

Judging from the fragments I have examined, if a perfect specimen were placed flat on the ventral side, then the depressed space or channel between the two posterior nodes of the head, would be horizontal, while the longer axis of the ovate frontal lobe would slope forwards and downwards, at an angle of between 60 and 80 degrees. In this position the length of the head of one of our specimens is about 3 inches, divided as follows: width of the neck segment 4 lines; from the neck segment to the posterior part of the median lobe 12 lines; thence to the most projecting point of the frontal lobe, forwards, 17 lines, in all 33 lines.

Placing the base of the frontal lobe in a horizontal position, the dimensions are as follows: greater length of the lobe (along the median line) 21 lines; greatest width about the mid-length 17 lines; greatest height above the constriction that surrounds the base 10 lines.

The frontal lobe, although 21 lines in length, owing to its sloping condition, only contributes about 17 lines to the length of the head.

The width of the space, between the bases of the two cones is six lines; height of the cones 5 lines. These cones perhaps represent the anterior pair of the glabellar lobes of an ordinary *Lichas*.

We have one specimen in which the length of the frontal lobe is 3 inches and its width about 2 inches.

The surface is covered with tubercles of various sizes up to 2 lines in width in the largest specimens. The space between the 2 cones is nearly smooth.

There are about a dozen specimens of the frontal lobe in the collection, and they vary from a length of 9 lines up to 3 inches.

Occurs in the Corniferous.

CHANGES OF NOMENCLATURE.

In 1860-1861, I described, in the Canadian Journal, a number of species of Devonian fossils, which appeared to be new. During the thirteen years that have elapsed, many changes have taken place in palæontological nomenclature, and several of the names then adopted must be changed.

1.—*Athyris Clara*, also described by Prof. Hall under the name of *Meristella elissa*. I am informed that this species has been long understood to be *Atrypa nasuta*, Conrad, although it was not recognized as such by Prof. Hall in 1860. If it is truly Conrad's species it should be called *Athyris nasuta*.

2.—*Rhynchonella ? Laura*, published May, 1860, is the same as Prof. Hall's *Leiorhynchus multicosta* of a later date. See Am. Jour. Sci. 2d Ser. vol. 31, p. 293. Our species may be called *Leiorhynchus Laura*.

3.—*Stricklandinia elongata*, may be changed to *Amphigenia elongata*.

4.—*Strophomena inaequistriata* is *S. inaequiradiata*, according to Prof. Hall.

4.—*Favosites basaltica*. When Goldfuss published this species he figured three specimens:

4a—From Lake Erie. 4b—from Gothland. 4c & d—from Eifel.

These represent, either two, or three species. The specific name can only be retained for one of these species. The question to be decided is "which of them"?

Lonsdale and McCoy, have expressed the opinion, that the specimen (c, d), from the Eifel, is *F. Gothlandica*. Prof. H. A. Nicholson, says in reference to this opinion, that "it is probable." —(Canadian Journal, 1873 ?)

Supposing these three authors, to be correct in this view—then (c, d) must be referred to *F. Gothlandica*, and the name, *F. basaltica*, retained for either one or both of the others.

The specimen figured by me as *F. basaltica*, is of the same species as 4a.

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